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NEW EXPERIMENTS AND OBSERVATIONS,

Relating to the

Generation of PLANTS:

Occaſion'd by

A LETTER lately publiſh'd in
the *Philoſophical Tranſactions*, by
Patrick Blair, M. D. F. R. S.

TOGETHER

With an Account of the extraordinary
Vegetation of Peaches, Abricots, Nectarines,
Plums, Cherries, Figs, Vines, Goosberries,
Currans, *&c.* as they were artificially cultivated
this Spring 1724.

By *R. BRADLEY*, R. S. S.

LONDON:
Printed for T. CORBETT, at *Addiſon's* Head without
Temple-Bar. M.DCC.XXIV.

(Price Sixpence.)

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New Improvements and Obſervations relating to the Generation of Plants, &c.

IT is the Buſineſs of a Philoſopher to contemplate the Works of Nature, and from due Obſervation and Experiments draw ſuch Inferences as may tend to publick Benefit. A Philoſopher ought by no means to be partial or retentive in the Diſcoveries he makes: let his Works be founded upon Facts, and his Mind generous and open in communicating his Uſeful Diſcoveries to Mankind; this, ſays a Learned Gentleman, ſhould be always conſider'd by the curious Naturaliſts, that they may avoid thoſe Rocks which ſome of the antient, as well as modern Authors, have ſplit upon: for without this Caution, many whoſe Genius leads them to improve from the Learning of others, may become poſſeſs'd of Principles which are Erroneous ; and by proſecuting their Studies upon ſo unſound a Baſis, produce nothing but Error, which will, as it falls more and more in the way of Novel Virtuoſi, debauch their Underſtandings ſo far, as never to let them into the Path of ſound Knowledge, 'till they are incapable of enjoying the Benefits which will ariſe from it. The great Lord *Moleſworth*, in ſome of his Writings, ſpeaking of the Prejudice of Education, tells us as much ; and I am perſuaded, that there is not one Man in the World that does not really find it to be ſo in ſome time or other of his Life, if he ever can attain the Liberty of thinking for himſelf, and has at the ſame time the Aſſiſtance of Reaſon and Experience.

'Twas Reaſons of this kind which led me firſt to collect and put together my Obſervations in Gardening ; for as the State of Gardening was eight or ten Years ago, the Profeſſors of that Art were ſo very Mechanical in their Performances, that every thing which was tranſacted in that way, was done without other reaſon than that their Fathers or Maſters had done ſo before 'em ; and therefore it muſt be right, tho' the Conſequence was ſo often fatal, that ſeveral

Gentlemen who had good Inclinations towards it, were ſo much diſappointed in their Undertakings, that they gave up their Gardens as expenſive Trifles.

My ingenious Friend Mr. *Laurence* was the firſt that open'd the new Scene of joining Philoſophy with the Practical Part, and by that means put it in the power of Men of Senſe and Fortune to undertake ſomething upon the foot of good Reaſon; and I have often wiſh'd the ſame curious Gentleman had had the ſame Opportunities of trying Experiments in the other Branches of Gardening, as he had in improving Fruit-Trees, I am perſuaded he would have overcome as great Difficulties in them as he has done in the Culture of Fruits. However, as he did not take the trouble of going ſo far, I took the Opportunity of laying my Papers before the World relating to the Culture of Flowers, Forreſt-Trees, Exotick-Plants, and Kitchen-Gardens, *&c.* as nearly following his Method as poſſible; and I am happy enough to find our *Engliſh* Gentry not diſpleas'd with the Scheme we have laid before 'em, inſomuch, that even ſome Nurſery Men confeſs they have had ten times the Buſineſs ſince we have open'd the Secrets of Gardening, than they ever had before; beſides the Pleaſure I have in meeting every where ſome kind of Garden or other which is in a flouriſhing State, from the delight moſt Gentlemen are now fallen into, of making Experiments themſelves in a rational way.

As in the Buſineſs of Phyſick, no Man can be a good Phyſician unleſs he underſtands the Parts and Structure of an human Body; ſo in the Affair of Gardening, no one can judiciouſly cultivate Health in Plants, unleſs he is acquainted with their ſeveral Parts, and their reſpective Uſes: which was the Reaſon I choſe to introduce my firſt Papers in that way, with ſome anatomical Deſcriptions of Plants, and ſome Obſervations I had made concerning their Method of generating, and bringing their Seed perfect into the World; that thereby the principal Deſign of Nature in the Growth and Improvement of Plants might become intelligible to the Lovers of Gardening, and render them capable of increaſing, amending, or altering of the Plants, which might happen to fall under their Care. As to the Firſt, which concerns the Anatomy of Plants, it explains how the Sap circulates, and diſcovers how a Plant receives its Nouriſhment from the Earth. In the Second we obſerve the Deſign of Nature in continuing the ſeveral Species of Plants to us by Seeds or Eggs in ſuch a manner, as is harmonious to the great Law, by which ſhe governs all other Bodies under the Sway of her extenſive Scepter. See *Chap.* 1. 2. in my *New Improvements of Gardening.*

My Syſtem of the Circulation of Sap in Vegetables has hitherto met with no Oppoſition, unleſs it were from ſome few Gardeners who do not know what Circulation means; and they, rather than loſe the firſt Impreſſion they receiv'd concerning the Sap of a Plant, of its riſing and falling as they call it, ſeem to reſolve that they will not be inform'd. But indeed the Circulation of Juices in Bodies, whether Vegetables or Animals, cannot very eaſily be conceiv'd, without firſt the Parts of which a Body is compos'd be well known, and then the very Motion of the Juices thro' thoſe Parts be explain'd and made apparent; which, in Animals, is viſible enough by help of the Microſcope, and in all the milky Plants, is plainly diſcoverable to the naked Eye, when any of their Leaves are cut in the Summer. This I owe entirely to that learned and curious Gentleman *Charles Du Bois*, Eſq; who firſt ſhew'd me the Experiment in his fine Gardens at *Mitcham*; but if yet this Doctrine might admit of a Query among the Gardeners, let 'em try my Method of transfuſing of young vigorous Sap into old decay'd Trees ſo as to recover the Strength of the latter, which I did with great Succeſs ſeveral Years ago, by planting ſome young Pear-Stocks about a Dwarf decaying Pear-Tree, and Inarching one into the other, by which means the vigorous Sap of the young Trees circulated through the Veſſels of the old Tree, and by that means renew'd its Strength, and brought good Fruit. In this Experiment, I ſaw'd the old Tree off (within four Inches of the Ground) from the Root when it was joyn'd with the young Stock, and let it remain ſupported by the young Trees it was inarch'd into, and ſome Wedges to bear part of its weight; and yet the old Tree, tho' it had not the benefit of its own Root, brought good Fruit, which it could not have done if the Juices of the young Stocks had not ſupply'd it. An Inſtance of this kind is now at Mr. *Fairchild*'s at *Hoxton*, done a year or two ago, as well as one of the revers'd Trees deſcrib'd in my Monthly Writings for *Anno* 1721.

The Generation of Plants I have conſider'd in a large Chapter in my *New Improvements of Planting and Gardening*, as well as in my Monthly Writings, and in my Philoſophical Account of the Works of Nature; in each of which Books I have, in many Inſtances, given Proofs of that Doctrine and its Uſe, in bringing Varieties from coupling different degrees of

Plants one with the other; but to ſet aſide what I have written upon that head, the late Mr. *Morland* F. R. S. in a Diſſertation printed in the *Philoſophical Tranſactions*, and Mr. *Geoffroy* of the Royal Academy of Sciences of *Paris*, has, in two or three Lectures before that Society, confirm'd my Syſtem beyond Contradiction. And even Dr. *Blair* F. R. S. allows, that Plants have a Mode of Generating, but does not agree with me about the manner in which it is perform'd, as may be obſerv'd in his Botanick Eſſays, *p.* 277. and in that Gentleman's Letter to Sir *Hans Sloan*, Bar^{t}. Preſident of the College of Phyſicians, publiſh'd in the *Philoſophical Tranſactions*, Numb. 369. For which Reaſon I think myſelf oblig'd to anſwer the Doctor's Objections, that none of thoſe, whoſe Buſineſs it is to inform themſelves in ſo eſſential a part of Gardening or Philoſophy, may be led into Error.

I confeſs I am not at all diſpleas'd, ſince this Syſtem of the *Generation of Plants*, admits of a Diſpute, that I have ſo curious a Gentleman as Dr. *Blair* to argue with; for from fair Argument, and juſt Obſervation, which we are to expect in Philoſophical Controverſy, it is not improbable but the Doubts and Objections which ſome might make againſt the Syſtem, may be clear'd up, and many Difficulties in the Generation of Animals be explain'd: For as Nature is harmonious in all her Works, ſo Diſcoveries made in the Vegetable Kingdom may oftentimes explain Difficulties in the Animal Kingdom, as well as the Circulation of the Blood in Animals has indicated to us, that there is a Circulation of Sap in Plants; or that there being a Mode of Generating among all Animals, has inform'd us that there muſt be ſomething analogous to it among Plants.

For the Reader's better underſtanding of this Argument, it will be neceſſary firſt to ſet down the moſt receiv'd Opinion concerning Generation in general, which is, That it is abſolutely neceſſary that ſome of the Male Seed be receiv'd into the *Uterus* of the Female, in ſuch a manner as to reach the *Ovum*, and even lodge itſelf in that Egg, before the Female can become pregnant; and again, it is no leſs certain, that the Seed of all Animals in Health abound with living Animalcula, ſome one of which, when receiv'd into the Egg as its proper *Nidus*, becomes in due time a perfect Animal according to its Kind. Theſe Animalcula are eaſily diſcover'd by good Microſcopes; and that ſome of the Semen which abounds with theſe Animalcules does paſs into the Egg itſelf, is evident from the Obſervations one makes every day of the Cock's Tread in the Eggs of Fowls and Birds, without which, it is known that the Egg will be unproductive; ſo it is plain, that if the Male Seed does not paſs into the *Ovum* of the Female, the Female cannot become pregnant, nor be productive of its own Species.

The Opinion againſt this is, That the Seed of the Male need not enter into the *Ovum* or Egg to impregnate it, but by being lodg'd near it, or any where in the *Uterus*, the bare Effluvia which proceed from it, are ſufficient to impregnate the Female; but this Opinion, as it depends upon no Principles of Nature, muſt conſequently be Erroneous. And this in the Caſe of Plants is Dr. *Blair*'s Opinion, as I ſhall explain by and by from his own Writings.

As I have ſet down the Caſe of Generation among Animals, it next follows that I give ſome account of it among Plants. In my Scheme is diſcover'd, that the Seat of Generation is in the Flower, that is to ſay, the Flowers of Plants are compos'd of ſuch Parts, as are plainly deſign'd for this Uſe; for as the Eggs or Seeds of Plants are always found in the Flowers of Vegetables, ſo it is plain that they do the Office of the *Uterus* in Animals; and ſince it is plain, that thoſe Seeds, before they are im-

impregnated, are as much without the *Punctum Vitæ*, as the Eggs laid by Female Birds that have not been with a Male, are without any lively part in them; then we may as reaſonably infer, that to make them become prolifick, they muſt have the aſſiſtance of ſome Male part to render them Fecund, or make them Pregnant. That the Female part of the Flower is in the Piſtillum, or Piſtle, we all agree; and that the Chives or Stamina of a Flower, with their Apices, in their full ripeneſs, fling out their impregnating Duſt as uſual, for the perfecting the Seeds or Eggs in the Piſtillum or Female part, we all allow likewiſe; and each of us has given Proofs enough of the Neceſſity of it to enliven and perfect the Seeds of a Plant: but the great Diſpute now in queſtion is, Whether the Duſt which proceeds from thoſe Parts which we allow to be Male, paſſes into thoſe Piſtles which we allow to be Female? or whether the Male Seed barely falling on the outſide of the *Uterus*, will impregnate the Eggs within it?

In my firſt Eſſay upon this Subject in *my New Improvements of Planting*, &c. I was not ſo poſitive of the Manner how this Generation of Plants was perform'd; but that I left room enough for thoſe who were contrary to my Opinion to pleaſe themſelves, and even gave them an Handle for reaſoning againſt me: but upon more mature Conſideration, in my *Philoſophical Account of the Works of Nature*, I judg'd it neceſſary to leave out the ſuppoſititious Turn which Dr. *Blair* takes notice of in my *New Improvements*, *page*. 19. where I ſay, "We may eaſily "conceive that the glutenous Matter, "and Velvet Covering on the extremity "of the Piſtils, may be capable of re"ceiving and holding ſome of the Powder "as it falls; and whether the Immiſſion "of the *Farina Fœcundans* be requiſite, "or not, its Lodgment on the Mouth of "the Piſtillum may, by virtue of its at"tractive Quality, *perhaps* fœcundate "the Seed contain'd in the Uterus." Now that the Male Duſt is always found upon theſe extreme Parts of the Piſtils, is evident from Obſervations that may be made every day, and we may obſerve too with Dr. *Blair*, that ſome other Parts of the Flower are not without it: but in this, as in other Caſes of Generation, it muſt be allow'd, that Nature beſtows upon every Male much more Seed than what is ſufficient to impregnate the Female, becauſe of the Difficulty it has in reaching the *Ovum* of the Female; for according to the Doctrine of *Animalcula in Semine Maſculino*, which is now generally receiv'd, a fifty thouſandth part of the Seed expended in time of Coupling, were it rightly plac'd, would render the Female pregnant, that is, by being receiv'd into the *Ovum* or Egg of the Female, as its proper *Nidus*. I ſay then, that it ſeems much more probable, that this impregnating Duſt comes nearer to the Point requir'd when it falls upon the Orifice of the Piſtillum, than when it falls upon any other part of the Flower; for this Orifice of the Piſtillum having an immediate Correſpondence with the Ovaries, or Egg-neſts, it's highly probable, that it may paſs from thence into the Eggs, which it cannot do from the other Parts of the Flower that have no Pipes or Paſſages that lead to the Egg; then it appears that what of this Male-Duſt does not fall upon or into the Orifice of the Piſtillum, is loſt.

But that we may the better conceive how this Male-Duſt may enter into the Paſſage of the Uterus, and ſo impregnate the Seeds or Eggs; I would recommend to the Curious, who have the Advantage of good Microſcopes, to examine with the ſame Glaſs, the Tube or Paſſage which leads to the Ovaries of the Flower, and ſome of the Male-Duſt of the ſame Flower; and they will find, that what we take for a ſingle Grain of that Duſt with the naked Eye, is a Multitude of Grains, and that the Paſſage into the Seat of the Egg-neſt, is capable of receiving many of them at one time. In my Diſſection of the Female Parts of the Tulip and of the Anemony by the Microſcope, in my *New Improvements of Planting*, &c. we may ſee this explain'd.

To carry on the Analogy between Plants and Animals yet a little farther, as far as it concerns the Generation of both, it may not be amiſs to take notice in this Place, of an Objection which ſome have made againſt the Probability of the Paſſage of the Male-Seed into the Uterus of an Animal, ſo as to reach the Eggs; becauſe, ſay they, when we examine the Female Parts of Generation in Animals after their Death, when we can only have the Opportunity of diſcovering the Situation of all their Branches, we find ſo ſmall a Paſſage into the Body of the Uterus, that a fine Horſe-hair can hardly be admitted, and the Uterus itſelf ſeems to be only a Lump of ſolid Fleſh: and then how is it poſſible that the Male-Seed can either be received into the Body of the Uterus, or can ever reach the Ovaries, ſo as to impregnate the Eggs in them; but yet that the Seed of the Male, or the Animalcula in that Seed, does reach the Eggs, and even paſs into them, is evident in thoſe Eggs of Fowls and Birds which we examine

mine after Copulation that have the Cock's Tread in them, without which they are Barren and Unproductive; and yet the Difficulty of the Male's Seed paſſing into thoſe Eggs, when we view the Parts of the Female after Death, is as hard to be accounted for as the other before-mention'd. And we muſt likewiſe obſerve, that when Hen-Birds lay Eggs without coupling with a Cock, as often happens, there is not that lively part found in them which renders them productive; from whence we find it is abſolutely neceſſary that ſome of the Male-Seed, or its Animalcula, muſt enter into the Eggs of the Female, to impregnate them: Moreover, it is obſervable, that every Female of any kind whatever has Ovaries or Egg-neſts, and that in every Branch of the Creation, every diſtinct Species has its Male and Female, aud without coupling together, there can be no increaſe.

To what I obſerv'd above concerning the State of the Generative Parts of Animals after they are dead, when ſcarce any Paſſage into the Uterus can be diſcover'd, or any Paſſage for the Male-Seed into the Ovaries be accounted for; I anſwer, that in living Bodies theſe Parts are vaſtly different from the State of thoſe we have mentioned: for it is natural enough to judge, that when the Circulation of Juices is performing its Duty in any common part of the Body, the Veſſels are more or leſs ſubject to be reſtrained or relax'd as the Nouriſhment they receiv'd at different times from different Foods direct them to be; but in the dead State, where all Motion is ceaſed, we muſt expect them always fix'd and contracted. Again, the Generative Parts of Animals are not conſtantly deſtin'd to the Work they were principally ordain'd for, and therefore are not always in a proper State for Generation; every Bird, every Quadrupede, every Inſect, and even every Plant too has its Seaſon appointed for this Work, when they live in the Road of Nature; but indeed when they are forced out of that Road, it is not rare to ſee them couple, breed, and produce their Young at uncommon Seaſons. Witneſs the Lambs brought forth in the Winter by invigorating Food given to the Ewes, Green Geeſe, Chickens, Pidgeons, and Plants too, to bring forth and bear Fruit in the Winter Seaſon, by Art. If then there is a Seaſon fix'd for Generation among thoſe parts of Nature which adhere to her Laws, it is as evident that the Generative Parts of theſe Branches are then in as different a poſture from what they were at other times, as there is a difference between the ſame parts living and dead in the ſame Bodies; and it is as evident too, that *in Coitu* the Parts I ſpeak of are more relaxed than at any other times: ſo that then there is no room to ſtart the Difficulty above-mention'd, *viz.* that there is not Paſſage ſufficient to admit the Male-Seed into the Uterus, or even into the Ovaries.

When I conſider how every Flower, when it is prepared for this Act, is ſo much under the Influence of the Sun, that the Flower Leaves, or Petals, open at its Approach, and ſhut up at its Departure; it explains to me, that the Piſtillum or Female Parts of Generation are relaxed one time more than another, *i. e.* that the Female Parts are more relax'd at the opening of the Flower, than when the Flower is ſhut up; for the Flower-Leaves or Petals adhering to the bottom of the Piſtillum, muſt conſequently, when they bend back, put every part of that Piſtillum into a different Poſture than it was in when the Flower-Leaves were ſhut; and it is very certain, that 'tis the Preſence of the Sun which ripens the Male-Duſt in the Apices, and opens the little Caſes in which it is contain'd, giving them a Springyneſs that flings forth that Duſt as ſoon as 'tis ripe, ſo as to ſcatter it to a conſiderable Diſtance. The Female Parts, as I obſerve, are at this time dilated by the opening of the Flower-Leaves, and the Apices or Chives concurcuring at the ſame time, in flinging forth their Male-Duſt, anſwers the ſame End in the Generation of Plants that the Act of Copulation does among Animals. But I may add yet one thing more to explain the Poſſibility, beſides the Neceſſity, of the Male-Seed's paſſing into the Uterus, which will I ſuppoſe put the Queſtion in hand out of diſpute; and that is, the Capacity of the Womb, as well to contain for a time, as to exclude at laſt a full-grown Fœtus, which is ſurely a ſufficient Proof of the Neceſſity of the Male-Seed's entring that Part, as well as a Demonſtration of its paſſing through that to the Ovaries, where, after impregnating the *Ovum*, or Egg, (or ſometimes more) we find all thoſe Paſſages become larger by degrees, as the Embrio encreaſes in Bigneſs; 'till at length the Burden they bear being too large for them to contain, is diſcharg'd to breathe the common Air: and yet after this vaſt Extenſion of the Parts we have been ſpeaking of, a very ſhort time contracts them ſo much, that there is no perceptible Alteration in them from what they were at firſt, and then are at liberty again of acting as Nature requires.

Now this is the Doctrine I maintain concerning the Generation of every thing that has Life over the Face of the whole Earth. Even in the Eggs of Inſects it is viſible enough, that the *Tread* of the Male, or Animalculum, muſt be lodged in the Egg before that Egg can be productive; and the imperfect Seed of a Plant, tho' it may grow as large as a prolifick Seed (as barren Eggs of other kinds will do) will be yet unprofitable as it is wanting of the Germe or Male Point of Life. As for the Animalcules in the Male-Seed of human Bodies, I have given a Figure of them in my *Philoſophical Account of the Works of Nature*; and tho' they do not carry the ſtrict Form with them of the Animal they are to produce, yet conſidering how Nature acts in other Caſes of the ſame kind, and how many Changes of Figure are undergone by thoſe Animals, where ſhe gives us Opportunity of Obſervation, as in Frogs, and Inſects; I think there will no Difficulty remain upon that account, ſince we find her Harmonious in all her Works. So that whether the Animalculum is of the ſame Figure 'tis to produce in the Animal, or a Grain of the Male-Duſt be of the ſame Figure as the Plant that is to come from it, is out of the queſtion; 'tis enough all Creatures that are Female have Eggs,

and that thoſe Eggs muſt be impregnated by the enlivening Seed of the Male. So that by no means I can agree with Dr. *Blair*, when he ſuppoſes that the bare ſcattering of the Male-Duſt upon parts of the Flowers remote from the Piſtillum (or Female Part of Generation) where there can be no Immiſſion of it into the Uterus, can have any Effect upon the Seeds or Eggs incloſed in the Ovaries, which are lodged within the Uterus or Piſtil; nor can I be of his Opinion, when he ſays that the Effluvia from the Farina, can have ſuch an Effect upon the Female Parts of a Plant, as to impregnate the Seeds within them: I ſhould as ſoon ſuppoſe that a Block of Marble would bring forth a beautiful Statue upon the bare Approach of a good Statuary. But that I may do Dr. *Blair* all the Juſtice I can, I ſhall relate a few Lines of his own, wherein are his chief Reaſonings againſt the Syſtem I ſupport of the Animalcules entering into the Egg. *Botanick* Eſſays, *page* 316.
" If in an Animalcule of the *Maſculine*
" Seed of a *Man*, a whole Man is lock'd
" up, then the ſeveral Particles previ-
" ouſly in the *Ovum* are no more than
" the firſt Food to this Stranger; this new
" arriv'd Child (who after being fatigued
" by ſo long a Journey, and through ſo
" many difficult, and unacceſſible Roads,

" when all thoſe in Company with him " have been ſo wearied, that they are " left behind and kill'd) has need of ſuch " Refreſhment to rouze up his Spirits, " and to make him grow up ſo as to become a briſk and lively Boy. But if " in the Female *Ovum*, there be ſuch a " Congeries of Particles of different Textures heap'd up together, as to furniſh " the Materials for all thoſe various Subſtances of which the Animal Body is " to be compos'd; is it not more reaſonable to ſuppoſe that this Subſtance only " wants *ſomewhat* to actuate and enliven " it, and to ſet all theſe Particles in ſuch " a Motion, that they may be regulated, " ranged, and ſet together ſo as to form " the Lineaments of a Fœtus, ſo ſoon as " this Prolifick Virtue is communicated " to them?" Thus far Dr. *Blair*; but I believe the Reaſons I have given above, for the Neceſſity of the Animalcules entering into the Egg, will be ſufficient to change his Opinion, eſpecially ſince in a Letter of the Doctor's, publiſh'd in the *Philoſophical Tranſactions*, N° 369. he tells us, that Mr. *Philip Miller* of the Phyſick Garden at *Chelſea* did by his Advice " ſeparate the Male-Plants of the " Spinage from the Female; the Conſequence was, that the Seeds did ſwell to " the uſual Bigneſs; but when he ſow'd

" it, it did not grow afterwards. He " ſearch'd into the Seed, and found it " wanted the *Punctum Vitæ*.

This, in my Opinion, is on my ſide the Queſtion; it anſwers directly to what I have ſaid of the Neceſſity of the Cock's Tread in the Egg to render it prolifick.

The Doctor then adds, " That the Female " Embryones might have been impregna- " ted another way, as (Mr. *Miller*) ex- " perimented with twelve Tulips, which " he ſet by themſelves about ſix or ſeven " Yards from any other; and as ſoon as " they blew, he took out the Stamina ſo " very carefully, that he ſcatter'd none of " the Duſt, and about two Days after- " wards, he ſaw Bees working on Tulips " in a Bed where he did not take out the " Stamina, and when they came out, " they were loaded with the Duſt on " their Bodies and Legs; he ſaw them fly " into the Tulips where he had taken out " the Stamina, and when they came out, " he went and found they had left behind " them ſufficient to impregnate theſe " Flowers, for they bore good ripe Seed.

This is an Inſtance of the Neceſſity of this Male-Duſt to impregnate the *Uterus* of a Flower, and ſeems to favour my Syſtem, rather than overthow it: for Bees do, by means of their Trump or Proboſcis, penetrate into the Female part of Flowers when they have opportunity of working, as may be obſerv'd every day; and when this is done, is there any Difficulty to conceive that the Male-Duſt can paſs or be convey'd into thoſe Parts ?

The Doctor then inſtances part of a Letter from the ſame Mr. *Miller*, concerning ſome Variations in Plants, which happens from the coupling of two different ſorts of Plants, as the Cabbage with the Savoy, and the red Cabbage with the white Cabbage, ſo that the Seeds ſav'd and gather'd from any one of them, will produce Varieties ; ſome reſembling in a great degree the Mother Plant, others partaking more of the Plant from whence the Male-Duſt might come. He obſerves, that out of a parcel of Savoy Seed, which grew near white and red Cabbages, " He had half red " Cabbages, and ſome white Cabba- " ges, and ſome Savoys with red Ribs, " and ſome neither one ſort nor other, " but a mixture of all ſorts together " in one Plant, which he ſuppoſes hap- " pen'd *by the Effluvia impregnating* " *the Uterus of one another.* This Experiment, (the Doctor obſerves) " is a moſt " convincing Argument for the Effluvia ; " for did each Grain of the *Farina* enter " the Piſtillum to its proper *Uterus*, this " mongrel Kind would never be produc'd.

But here I beg leave to diſſent from Dr. *Blair*'s Opinion, for if the Impregnation of the Female was from the Effluvia of the Male-Seed, we may be ſure thoſe Effluvia muſt be all of one ſort, as well as the Bodies thoſe Effluvia proceed from are all of one ſort, as the Doctor ſays, and I ſhould readily come into, if in the whole Scene of Nature I could find *two Likes*; but as that has not yet been diſcover'd, it is reaſonable enough to ſuppoſe there is no ſuch thing: and I think this is a ſufficient Anſwer to the Doctor's Objection to the Animalcules entring the *Ovum*, where he ſays, *That if it was ſo, the mungrel Kind could not be produced.* But let us ſuppoſe, that all the Animalcula in one Male were exactly alike in their State of Animalcula, it will not at all be ſurpriſing to find the one different from the other in Feature, in Bulk, *&c.* when they come to be perfected; for the Female Eggs which receive them, tho' thoſe Eggs are in the ſame Female, have not all ſtrictly the ſame proportion of Parts and Juices to nouriſh the Animalcula they receive; and therefore, the little Animals cannot be equally the ſame when they come to that Perfection we ſee them in, when they are excluded the *Matrix*. Beſides, ſo great is the alteration of Parts in the ſame perfect Animal, from difference of Diet, and change of Method in the way of Life, that a Year or two will ſometimes make ſo great an alteration in the ſame Man, that he can ſcarce be known by thoſe who have been ſo long abſent from him.

As for what is mention'd concerning the Cabbage partaking of the Savoy, or the Savoy partaking of the Cabbage, it is no more than what is frequent in Animals of the ſame Tribe. A Greyhound, for Example, coupling with a Spaniel, will produce a croſs Strain partaking of both ; theſe are both of the Dog kind, as the Cabbage and Savoy are of one kind : ſo that 'tis no wonder they can couple as they do, and produce Varieties, ſince, I think, I have made it plain, that *no two* Animals, no more than any two of the Animalcula, are ſtrictly alike ; and beſides that, the Difference of Nouriſhment given by each reſpective Egg, for the Support of that *Punctum Vitæ*, or Animalculum each Egg contains, will occaſion difference in the Form or Manner of the young Plants or Animals to be produc'd : and this, I think, will be ſufficient to ſupport my Syſtem of the *Generation of Plants*, againſt Dr. *Blair*'s Objections.

An Anſwer to ſome Objections that have been made againſt the Perfection in Taſte and Flavour in Fruits forced out of their natural Seaſons; wherein is ſet down ſome Obſervations relating to the extraordinary Vegetation of Peaches, Vines, Nectarines, Abricots, Plums, Figs, Cherries, and ſome others which I have rais'd this Spring, 1724. *at* Vaux-Hall, *in* Surry.

IN my Monthly Papers for the Improvement of Husbandry and Gardening, I have preſcribed a Method for bringing Fruit of any ſort to Perfection at any time of the Year; but however plain that Method is laid down, very few have yet attempted to put it in practice, either perhaps from a thought that it would be too Expenſive, or that one muſt wait ſome Years before the Tree would bear, or elſe that the Whole was little better than Chimæra; or if it was to be done, yet ſuch forced Fruits would be wanting of their Excellence in Taſte and Flavour. For ſome of theſe Reaſons I gueſs we find ſo little perform'd hitherto upon that account, and the Practice of this Art might have been buried ſtill in

Oblivion, if a Gentleman of Worth and Fortune of the *Temple*, whoſe great Delight is in the diſcovery of curious and uſeful Things for the Service of his Country, had not given me an Opportunity of experimenting what I had affirm'd in my Writings; and altho' the Seaſon was advanc'd as far as *Chriſtmas*, he was not yet diſcouraged in the Undertaking, but reſolv'd I ſhould proceed as well as I could. The Air and Soil which we firſt approv'd of about Town, was at *Vaux-Hall*, where the Effluvia of the River concurring with the Lightneſs of the Earth, would both help in the Deſign. This being premis'd, I ſet to work in ſuch Sort, that in a few days the Frames and Glaſſes were provided, and I began planting in the *Chriſtmas* Holydays, the Weather then being very mild and open. In this Undertaking I was Fortunate enough to meet with Trees, which had been trained againſt Walls, and others that were in Pots, and had been brought to a bearing State by the Management of Mr. *Whitmil*, a curious Nurſery-Man at *Hoxton*. I planted a whole Frame at once of a conſiderable Length, having this particular Regard, that none of the ſmall Fibres of the Roots become dry before the Trees were fix'd in the Place where they now grow; and that the Ground they were planted in, ſhould immediately be cloſed to the Roots. I planted every Tree in a Mud prepared with fine Earth and Water, ſo that the removal of theſe Trees gave them no Check, neither would I ſuffer the Heads of the Trees to be pruned at the time of planting, as is uſually done by the Gardeners; for as I have mentioned ſeven or eight Years ago in my Works, when I wrote of the Sap Circulation, theſe Branches above Ground remaining entire, are the better able to ſupport the Roots of the new planted Tree 'till it has got hold of the Ground, and the Buds begin to open; and then indeed it is neceſſary to prune the Parts above Ground equal to what has been loſt in the Roots by the removal of the Tree; which will be ſomething, however carefully it be taken up. My Plantation being thus order'd, and the Shoots of the Trees being nail'd as cloſe as could be to the Pales, the Horſe Dung was apply'd to the Back of the Frame, and the Glaſſes ſhut down over the Front; the Conſequence was, that the Buds of the Cherries were green five days afterward, and in five days more, the white of the Flower Bloſſoms appear'd, and many of them were full blown in fifteen Days.

The Abricot, which were of a late ſort, flower'd with the Cherries; and the Anne-Peach, with the early Newington-Peach; and Newington-Nectarine kept them company, as well as ſome of the Roſes and Gooſeberries: but what was moſt obſervable, a Plant of the Nutmeg-Peach, which is a very early Fruit, that the Gardener had prun'd in the head before I was aware, did not begin to ſwell in the Bud till the later Peaches were in full Bloom.

The Plums were in full Bloom in about twenty days after Planting, *i. e.* about the 23d of *January*, and particularly the imperial Plum, which is a large ſort, and none of the earlieſt. The Figs follow'd the Plums in the ſwelling of their Fruit Buds, which grew to be about two Inches long the firſt Week in *February*, and the Vines had then ſhot an Inch, and the Currans about that time firſt began to ſhoot. At this time there were Cherries as big as large Peaſe; but by an unlucky Blight, which got into the Frame, during my Abſence, came to nothing: This I mention, that thoſe Gentlemen who deſign to follow this Practice, muſt be very careful how they open any of the Glaſſes while the Air is unſettled, and be ſure never to open them, when there is any Winds blowing from the *South-Eaſt*, or

South-Weſt; for the Tenderneſs of the Leaves and Bloſſoms, whilſt they are in the State I ſpeak of, cannot bear the fluttering of the Winds, which bruiſe their Sap-Veſſels. However, about the middle of *February*, there appeared ſeveral fine Branches of Grapes upon the Vines, which bloſſom'd at the end of the Month; the Plants having been brought to bear Fruit in Pots the Year before by Mr. *Benjamin Whitmill* above-mention'd. My Cherries were then (ſuch as were recover'd of the Blight) as large as Peaſe, and ripen'd the firſt Week in *March*; and the Plums of the imperial ſort, were then above an Inch in length. The Abricots were as big as ſmall Walnuts, and the Peaches were as large as Hazlenuts: Goosberries had then Green Fruit of a good ſize, and the Currans were anſwering to them.

From theſe Obſervations, one may perceive how ſuddenly Fruits may be rais'd, and likewiſe take notice, that beſides the Attendance they require in airing them at proper times, the Expence of warming the Back of the Frames with Dung cannot be great, becauſe the Dung, after the Heat has left it, may be ſold to the Farmers for very little loſs. And, that the Fruit which is produc'd by this means, may be as well taſted as natural Fruit, is as evident, ſince the Trees have the whole Body of Earth to feed from, and there are proper Means to be us'd to give them Air; and again, none of the Steam of the Dung can come at them, and they have ſhare of Heat and Sun enough to ripen them. I ſhould not have written this, but I am willing to give Satiſfaction to thoſe Gentlemen who are now preparing to follow this Example the next Winter; and that they may not be impos'd upon, nor led into Error by thoſe who know nothing of the Matter, and if yet they have any Difficulties about this Affair, I ſhall readily give my Opinion, if they direct to the Publiſher of this Treatiſe.

FINIS.

Juſt Publiſh'd,

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